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INFLUENCE OF CORONAL ABUNDANCE VARIATIONS

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The Multispecies loop modeling project addresses the modeling of TRACE and SOHO observations as a plasma rather than a single fluid. In the single-fluid approximation the effects of heavy species are considered in an averaged sense. Further, loop abundances are usually taken to be uniform throughout the loop, in spite of observational evidence for considerable variation in coronal abundances.

In the first year of our study we examined the stability of large scale loops. Our findings will be submitted as a paper this June. We assert that the corona must be dynamic at size scales on the order of the coronal scale height. While small-scale dynamics are expected, large-scale dynamics are often assumed effectively absent. The stationary assumption not only simplifies theoretical formulation and observational interpretation, but is consistent with x-ray and UV observations of the corona that suggest the existence of structures that maintain their large-scale morphology on timescales longer than the coronal heating/cooling time. We argue that although such structures may appear static, they must be sustaining mixing and and/or bulk flows in order to be observable at coronal temperatures.

In the coming year we will apply a newly developed code that follows the evolution of multiple ion species and includes large scale flows to active regions observed by TRACE and CDS.